PYASKOVSKAYA-FESENKIVA, YE.V.

1 Jan 53

USSR/Geophysics-Light Scattering

"Some Properties of Atmospheric Indicatrices of Light Scattering," Ye.V. Pyaskovskaya-Fesenkiva, Astrophys Inst, Acad Sci Kazakh SSR

Dan-SSSR, Vol 88, No 1, pp 53-56

Describes exptl results from observations of light scattering and presents rwl relating scattering angles and indicatrices. Received 4 Nov 52
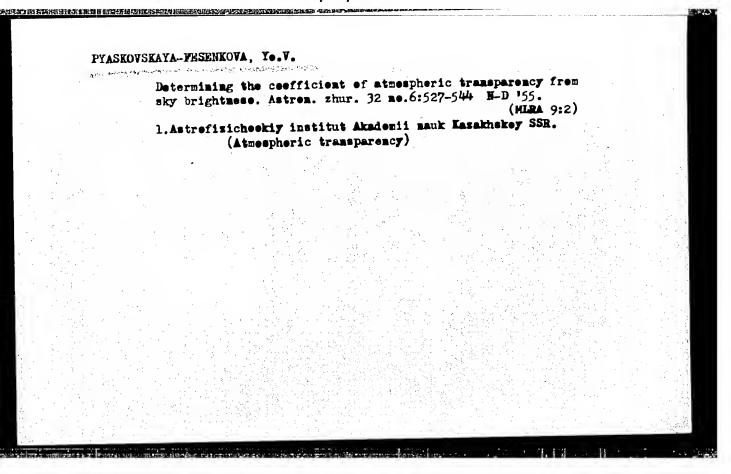
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PYASKOVSKAYA-FESENKOVA, Ye.V.

Some facts on light scattering in the atmosphere. Izv.
Astrofiz.Inst. AN Kazakh.SSR 1 no.1/2:188-202 '55.     (MLRA 9:10)

(Atmospheric transparency) (Light--Scattering)

PYASKOVSKAYA-FESENKOVA, Ye.V.

Relation between the light scattering coefficient for
various angles and the optical thickness of the atmosphere.
Izv. Astrofiz.Inst. AN Kazakh.SSR 1 no.1/2:203-213 '55.

(MLRA 9:10)

(Atmospheric transparency) (Light--Scattering)

PYASKOVSKAYA-FESENKOVA, Ye.V.

Determining the coefficient of atmospheric transparency from
sky brightness. Astron. zhur. 32 no.6:527-544 N-D '55.
(MLRA 9:2)

1.Astrofizicheskiy institut Akademii nauk Kazakhskoy SSR.
(Atmospheric transparency)

PYAS KOVSKAYA, YE. V.

USSR/ Geophysics – Light dispersion

Card   1/1      Pub. 22 – 22/62

Authors    : Pyaskovskaya – Fesenkova, Ye. V.

Title      : Calculation of light dispersion of the higher orders

Periodical : Dok. AN SSSR 102/3, 503 – 508, May 21, 1955

Abstract   : A proof is presented that the light dispersion of the higher orders can
             be computed from the data obtained in plain direct observations.  Four
             USSR references (1943-1955).  Diagrams.

Institution : The Acad. of Sc., USSR, Astrophysical Institute  Alma-ata, Kaz,SSR

Presented by: Academician V. G. Fesenkov, February 15, 1955

PYASKOVSKAYA-FESENKOVA, Ye.V.

Brightness of the sky considering all forms of light scattering.
Dokl.AN SSSR 103 no.6:1013-1015  Ag '55.                (MIRA 9:1)

1.Predstavleno akademikom V.G.Fesenkovym.
                 (Sky, Color of)

PYASKOVSKAYA-FESENKOVA, Ye.V.

Various methods for determining the atmospheric transparency
coefficient. Izv.Astrofiz.Inst. AN Kazakh. SSR 3 no.4:73-82
'56.                                                    (MLRA 9:10)

(Atmospheric transparency)

PYASKOVSKAYA-FESENKOVA, Ye.V.

Calculation of light scattering of higher orders.  Izv.Astrofiz.
Inst. AN Kazakh. SSR 3 no.4:99-100 '56.          (MLRA 9:10)

(Light--Scattering)

Name:  PYASKOVSKAYA-FESENKOVA, Yevgeniya
                                         Vladimirovna

Dissertation: Study of the dispersion of light in the
              earth' atmosphere

Degree: Doc Phys-Math Sci

Affiliation: Astrophysical Inst of Acad Sci Kazakh
             SSR

Defense Date, Place: 22 Mar 57, Joint Council of Inst of
                     Physics of the Earth, Inst of Physics
                     of the Atmosphere, and Inst of Applied
                     Geophysics, Acad Sci USSR

Certification Date: 21 Sep 57

Source: BMVO 22/57

PHASE I BOOK EXPLOITATION

Pyaskovskaya-Fesenkova, Ye. V.

Issledovaniye rasseyaniya sveta v zemnoy atmosfere (Investigation of Light Scatter-
ing in the Earth's Atmosphere) Moscow, Izd-vo AN SSSR, 1957.  217 p.  2,500
copies printed.

Sponsoring Agency:  Akademiya nauk SSSR.

Resp. Ed.:  Fesenkov, V. G.; Ed. of Publishing House:  Yefremov, Yu. I.;
Tech. Ed.:  Kiseleva, A. A.

PURPOSE:  The book presents advances made in the study of light scattering in
terrestrial atmosphere and is directed to the specialist in the field.

COVERAGE:  This book is a theoretical study of the optics of terrestrial atmosphere
and is supplemented with observations of the brightness of the daylight
sky conditioned by molecular and aerosol scattering of light.  A new
method is proposed for the derivation of the scattering indicatrix from
the calculation of multiple light scattering in the atmosphere.

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V. G. Fesenkov's criterion of stability of the optical properties of atmosphere is refined and expanded. The author discusses his proposed methods for determining the atmospheric transparency coefficient and the brightness of the daylight sky. Observations of sky brightness were performed by: N. N. Kalitin, G. A. Tikhov, V. G. Fesenkov (Astrophysical Observatory at Kuchino "Astrofizicheskaya observatoriya v Kuchino pod Moskvoy"); V. A. Krat (Tashkent); V. V. Sobolev and Ye. N. Yustova (Yelabuga); V. N. Yaroslavtsev (Tashkent); G. Sh. Livshits (Alma-Ata); Ye. V. Pyaskovskaya-Fesenkova; L. V. Fesenkova; A. P. Kutyreva; T. P. Toropova; V. M. Kazachevskiy; P. N. Boyko; and N. I. Ovchinnikova. The author made visual-photometry observations at different places varying in elevation (h): Gudauta, Caucasian shore of the Black Sea (h = 3m.); a state farm near Pugachevsk (h = 100m.); Orlinaya gora at Vladivostok (h = 144m.); sanatorium "Yzkoye" near Moscow (h ≈ 150m.); village of Bogorodsoye near Ivanovo (h ≈ 150m.); Sary-Ishik-Ortau Desert, Southern Pribalkhash (h = 400m.); Sikhote-Alin' (h ≈ 600m.); Alma-Ata Observatory (h = 1450m.); shore of Issyk-Kul' Lake (h = 1600m.); Kislovodsk Astronomical Station of the GAO AN SSSR (h = 2130m.), and Kumbel' Mountain near Alma-Ata (h = 3140m.). Other personalities mentioned: G. Sh. Lifshits, K. N. Shistovskiy, Kh. A. Abishev, M. P. Pervertyn, V. B. Nikonov, V. G. Kastrov, Ye. S. Kuznetsov, and V. V. Ovchinskiy. There are 106 figures, 65 tables, and 104 references, 77 of which are Soviet, 9 USA, 2 British, and 1 Polish.

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AVAILABLE:  Library of Congress

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PYASKOVSKAYA — FESENKOVA, Ye.V.

AUTHOR: Kirillov, F.A.                                     49-12-15/16

TITLE:  Dissertations Defended in the Scientific Council of the
        Institute of Physics of the Earth, Institute of Physics of the
        Atmosphere and Institute of Applied Geophysics, Ac.Sc.USSR during
        the First Semester of 1957 (Dissertatsii, zashchishchennye v uchenom
        sovete instituta fiziki zemli, instituta fiziki atmosfery i
        instituta prikladnoy geofiziki AN SSSR za pervoye polugodiye 1957)

PERIODICAL:  Izvestiya Akademii Nauk SSSR, Seriya Geofizicheskaya,
                          1957, No.12, pp. 1532 - 1536 (USSR).

ABSTRACT:   Ye.S. Borisevich - Magneto-electric Oscillographs for
        Experimental Geophysical Investigations (Magnitoelektricheskiye
        ostsillografy dlya eksperimental'nykh geofizicheskikh issledovaniy) -
        Doctor dissertation.  Opponents: Corresponding Member of the Ac.Sc.
        USSR,M.A. Sadovskiy, Doctor of Physico-Mathematical Sciences,
        D.P.Kirnos, Doctor of Technical Sciences, G.L. Shnirman.May 10,1957.
        In the dissertation, the design was briefly reviewed of 16 various
        models of oscillographs for experimental, geophysical investigations
        which were developed by the author or under his direction. Some of
        these are series-manufactures and apply also in other branches of
        science and engineering. Particular attention is devoted to the
        design of the individual assemblies of the oscillographs. Standard
        assemblies include type Г Б galvanometers, mounted into blocks
Card    with permanent magnets, galvanometer illumination, time markers,
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compact gear boxes with swivel-mounted sectors, spring-powered
engines, speed regulators. All the oscillographs developed by
the Institute of Physics of the Earth, which is pioneering in this
field in the Soviet Union, can be sub-divided into the following
three groups: oscillographs for recording short-duration processes
with high speeds of the film; oscillographs for recording long-
duration of occasional processes at relatively low speeds of the
film strip; universal oscillographs for recording various proces-
ses within a wide range of speeds of the film strip. Oscillographs
intended for recording long-duration and occasional phenomena
(earthquakes) and designed for recording with a speed of 0.1 to
2 cm/sec for moving the film; spring-operated mechanisms proved
advantageous in this case and therefore it was necessary to develop
special speed-regulators. The presence of spring-operated
mechanisms and galvanometers grouped into a block with a common
permanent magnet enabled reducing parasitic influences on the
metering circuit and also reducing to a

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minimum the power consumption of the oscillograph, which is particularly important in regions with difficult access. Universal, portable oscillographs represent the widest group amongst oscillographs produced in the Institute; they are small and light and therefore convenient for expeditions; they are suitable not only for recording geophysical, but any other phenomena which can be transformed into an electric current or voltage. The oscillographs ПОБ-14 M, ПОБ-12 M and ПОБ-9 are among the best produced in the Soviet Union as well as in other countries. The developed, fundamental, typical assemblies and unification of the main circuits enabled rationalising the design of the oscillographs and also simplifying and covering the cost of the development and manufacture of new models adapted for given conditions. First, the author considers the method of calculation of the basic elements of the oscillographs which he has developed; all the calculations were tested by practical experience and are effected by formulae which are convenient for practical use. For simplifying the calculations, nomograms,

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data tables and examples are included. A fundamentally-new
metering system was created; a high-frequency, frame galvan-
ometer with a "continuous extension (pull)" and a method of
calculation is presented for this type of galvanometer, giving
results of experimental investigations which indicate the possi-
bility of achieving a sensitivity exceeding that of loops. The
conditions of optimum electro-magnetic and liquid damping of
frame galvanometers were investigated. The calculation is
presented of the kinematics of oscillographs and of film adaptors
and the phenomenon of shock was considered when switching on
film adaptors designed for high speeds. Formulae are derived
which permit calculation of the impact force and of the time
necessary for reaching a given speed. A new type of simple,
compact and reliable gear box was developed and the method of
its calculation evolved. Other mechanisms were also considered,
intended for stepped and stepless speed changes and used for
oscillographs. A method of calculation is proposed of spring-
Card4/21 operated mechanisms for oscillographs aiming at achieving maximum

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useful work from the energy stored in the springs. The problem is considered of ensuring uniform movement of the film strip and various designs were developed of speed regulators with low-rated r.p.m. which are capable of taking up a considerable excess moment generated by the springs. A method of calculation is presented of a radial-action, centrifugal regulator. All the described oscillographs were used in geophysical investigations, i.e. in studying the physics of earthquakes by systematic recording of weak, local tremors, development of a new method of deep seismic-sounding of the Earth's crust, study of the vibrations of soils and of buildings caused by explosions and earthquakes, development of new, progressive methods of seismic and electro-magnetic prospecting of minerals study of atmospheric phenomena, etc. The oscillographs developed by the author are widely used, not only for geophysical investigations, but also in scientific establishments and undertakings of various ministries and the manufacture of these instruments does not satisfy requirements.

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Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac.Sc. USSR during the First Semester of 1957.

Ye.V. Pyaskovskaya-Fesenkova - Investigation of the Scattering of Light in the Earth's Atmosphere (Issledovaniye rasseyaniya sveta v zemnoy atmosfere) - Doctor dissertation. Opponents: Doctor of Physico-Mathematical Sciences Ye.S. Kuznetsov, Doctor of Physico-Mathematical Sciences S.M. Polozkov, Doctor of Physico-Mathematical Sciences G.B. Rozenberg, Doctor of Physico-Mathematical Sciences I.S. Shklovskiy. March 23, 1957. The dissertation represents the result of many years of study of the clear, daytime sky. The observations were carried out in twelve locations at various altitudes above the sea, various climatic, meteorological and synoptic conditions. The observations were carried out mainly during high-transparency of the atmosphere in the visual range of the spectrum in the absence of a snow cover. In the investigations two instruments, designed by V.G. Fesenkov were used; one of these was a visual photometer of the daytime sky intended for measuring the brightness of the firmament; the other was a photo-

Card6/21 electric halo photometer for determining the brightness from

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near-sun halo and also from the sun on a surface perpendicular to these rays. The dissertation contains **a certain formula** of the brightness of the sky, taking into consideration only the brightness of the first order and derived on the assumption of a "flat" Earth and giving some conclusions derived on the basis of this formula. For a certain coefficient of transparency of the atmosphere, the brightness of the sky at any point is represented by derivation of two functions of which one is the function **of the diffusion of** light and the other is a function of the zenith distances of the sun and of the observed point of the sky. On changing of the zenith distances of the sun $z$ from 90 to $0°$, the brightness of the sky on the almucantar of the sun increases first, reaching a maximum for a certain value of $z$, and then decreases. A method is also proposed of determining the brightness of the clear daylight sky at any point based on measuring the brightness along the almucantar of the sun and of 5-6 points of the firmament located at various zenith distances. This method permits determination

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of the brightness at any other point from the observed brightness of the sky. The method consists essentially of excluding from the observed brightnesses local indicatrices of the diffusion and introducing another one which relates to the spot where it is desired to determine the brightness of the sky; for this purpose, it is necessary to measure at that point the brightness of the sky along the almucantar of the sun. A necessary condition thereby is that the transparency coefficients of the atmosphere be equal in both points. The theoretical brightness was also considered, taking into consideration the multiple scattering of light in the case of a spherical indicatrix of scattering and a comparison is made of this brightness with the one observed at an angular distance of the sun of $57 - 60°$. For solving the integral equation of the theory of the diffusion of light, the approximate method of Ye.S. Kuznetsov was used which proved sufficiently accurate.
Diffusion indicatrices are given in the dissertation which Card8/21 were obtained from observations of the brightness of the sky

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calculated for the entire height of the atmosphere. It is shown that there is no well-defined relation between the coefficient of scattering $\mu$ for small scattering angles $\vartheta$ and the coefficient of transparency or, respectively, the optical thickness of the atmosphere. Such a well-defined dependence does exist for diffusion angles approaching $60^0$. Thus, the diffusion of light near $\vartheta = 60^0$ does not depend on the properties of the diffusion particles. It is shown that the diffusion of light in the Earth's atmosphere cannot be attributed to a medium particle with some definite effective radius. The effective radius of the diffusion particle changes with the diffusion angle. The dependence of the diffusion of light in the Earth's atmosphere on the wavelength for the visual part of the spectrum can be expressed by the relation $\mu = c\lambda^{-n}$, representing a generalisation of the known Rayleigh formula where $n > 0$ and independent of the wavelength for all angular distances of the sun, provided the dust content of the atmosphere is not high. If that is not the case, this relation is disturbed and becomes somewhat complicated for small angular

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distances to the sun (the halo surrounding the sun);  the
number  n  is dependent on the wavelength and in some parts of
the spectrum may become negative.  This explains the various
colour shadings of the halo surrounding the sun.  A method is
proposed of determining the indicatrix of the atmosphere which
is not affected by the influence of the multiple diffusion of
light.  This method permits obtaining the indicatrix solely from
the observed data and consists in determining by two differing
methods the optical thickness of the atmosphere.  One method
gives optical thickness $\tau_1$ on the basis of measurement of the
direct solar radiation and is therefore not dependent on the
multiple diffusion of light.  In the other method, the optical
thickness is determined by measuring the brightness of the sky
and, consequently, is influenced by the multiple diffusion.
The difference between these gives an increase in the optical
thickness of the atmosphere which depends on the multiple
diffusion of light, i.e. of the diffusion in all directions
Card10/2bf the light flux caused by diffusion of higher orders relative

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to the incident light flux.  The author gives the formula of the brightness of the sky, taking into consideration the multiple diffusion and also the light reflected from the underlying surface.  The problem of stability of optical properties of the atmosphere was  considered and existing stability criteria were supplemented and improved by the author.  It is shown, too, that the ratio of the brightness of the sky at any point of the almucantar  of the sun to the illumination from the sun also gives a linear dependence on the atmosphere mass and consequently can serve as a criterion of stability of the optical properties of the atmosphere.  Finally, methods are described of determination of coefficients of transparency of the atmosphere from the brightness of a clear sky, namely:  a method based on the instant of maximum brightness of the halo surrounding the sun; a method based on the indicatrix of diffusion of light in the atmosphere;  a method of determining the coefficient of transparency on the basis of empirical formulae.

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V.A. Romanyuk - Determination of the Gravity Forces on the Sea by the Pendulum Method (Opredeleniye tyazhesti na more mayatnikovym sposobom) - Candidate dissertation. Opponents: Doctor of Physico-Mathematical Sciences I.D. Zhongolovich, Doctor of Physico-Mathematical Sciences V.V. Fedynskiy, Candidate of Physico-Mathematical Sciences N.N. Parlyskiy. May 31, 1957. The author attempted to make a more exact analysis of the movement of a pendulum on a mobile support with the aim of deriving more accurate formulae and developing methods for the calculation of the action of acceleration and inclination of the base of the pendulum. The calculation of this action is precisely the most important and least clear problem in the theory of the measurement of gravity forces on sea.
The author obtained a formula for the correction of the inclination and acceleration of the support in the observed value of gravity force which is valid for accelerations below 50 gl.

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The main terms of this relation correspond to the corrections of Brown, but there is some divergence in the terms

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which depend on the periods of oscillations of the pendulum and
the accelerations. In many cases, these terms can be dis-
regarded. The problem was formulated and solved of determining
the accelerations and the inclinations of the mounting by means
of inclination-meters and accelero-meters. Attention is drawn
to the erroneous nature of the view relating to the compensation
of the term $\ddot{z}_0$ during the observation time ($\ddot{z}_0$ - vertical

acceleration component of the mounting in an absolute system of
co-ordinates). Under certain unfavourable conditions, partic-
ularly during observations in submarines, $\ddot{z}_0$ can be consider-

ably larger than the value of other correction factors of the
second order. For reducing the influence of the term $\ddot{z}_0$ ,

the author proposed to increase the number of measurements
at various sections of the film during determination of the
average period of the pendulum; for this purpose, it is necessary
to carry out recordings at the beginning and at the end of
observations at high-speed of movement of the film for durations

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of 4 - 6 minutes. The advantage was emphasised of constructing pendulum instruments in a cardan suspension with a minimum natural frequency. It is not advisable to apply a damping device of the cardan suspension, which is linked with the ship. Methods were developed and investigated of evaluating the recordings of inclination-meters and accelero-meters for obtaining correction for the inclination and the acceleration and appropriate calculations were made based on materials collected by marine gravimetric expeditions. It is concluded that it is in principle possible to effect pendulum measurements on surface ships provided that the acceleration of the ship is below 20 gl; at larger accelerations, considerable difficulties occur associated with the determination of the accelerations and inclinations.

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I.I. Rokityanskiy - Induced Polarisation in Ion-conducting Rocks (Vyzvannaya polyarizatsiya ionoprovodyashchikh porod) - Candidate dissertation. Opponents: Doctor of Geol.-Min. Sciences V.N. Dakhov, Doctor of Phys.-Math. Sciences A.G.Tarkhov, Candidate of Phys.-Math. Sciences D.A. Fridrikhsberg. May 17, 1957.

The author investigated under induced polarisation the physico-chemical phenomena taking place in rocks and other non-uniformly conducting bodies under the effect of an electric current. These phenomena lead to the generation of secondary e.m.f. which exist for some time, even after the primary current is switched off. Study of the nature of the induced polarisation of ion-conducting rocks is of great importance in elucidating the prospecting possibilities of this method, both in field prosp-ecting, particularly coring, and also for studying the properties of transient regions between the liquid (water) and solid dielectric, i.e. in elucidating one of the difficult problems of the physics

Card15/21of surfaces. The author has studied the influence on induced

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polarisation  of a number of factors:  the chemical composition
of the pore moisture, the  $\zeta$-potential, the structure of the
specimen and its uniformity.  The experiments were effected in
quartz sand which was boiled several times in hydrochloric and
nitric acids and then washed in distilled water until the
resistance of the pore solution did not reach the resistance of
the distilled water (2 500 $\Omega$m).  It was found that the chemical
composition of the pore moisture influenced the induced polaris-
ation only through the specific resistance and the  $\zeta$-potential.
For an equal specific resistance of the specimens, the induced
polarisation will be the larger, the larger the negative
$\zeta$-potential.  In the case of a constant $\zeta$-potential, the
induced polarisation is proportional to the specific resistance
of the specimen, but the speed of the drop does not depend on
the specific resistance.  In moisture-saturated sands with a
re-charged, twin electric layer, the induced polarisation
approaches zero and does not depend on the  $\zeta$-potential. However,
Card16/21in specimens which were not moisture-saturated, but did have a

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re-charged, twin, electric layer, the induced polarisation increases sharply with increasing $\zeta$-potential. On reducing the humidity, the induced polarisation increases proportionally with the specific resistance of the specimen, but for low humidity contents, this increase slows down, the induced polarisation passes through a maximum and then decreases, although the specific resistance of the specimen continues to increase. The author has proved the existence of a certain dependence of the induced polarisation on the degree of dispersion and thereby he indicated the possibility of applying the method of induced polarisation for coring oil deposits for the purpose of determining the permeability and the specific conductivity of rocks. He also obtained the relation between the speed of fall of the induced polarisation and the degree of dispersion. For sands, the speed of fall is the higher the finer the sand. This result seems to favour the view that when passing an electric current through the specimen,

Card17/21 each sand grain is similar to an electric dipole and the drop

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in the induced polarisation represents the total field of the discharge of these dipoles. The fundamental relations of induced polarisation of ion-conducting rocks were clarified, starting off by taking into consideration the forces acting on the charges of the diffusion part of the twin, electric layer. In the equilibrium state (in the absence of current flow), the only force maintaining the charges of the diffusion layer around the surface is the electro-static attraction from the charges of the fixed layer; therefore, the surface density of the charges of the diffusion layer at each point of the surface equals the density of the charges of the fixed layer. It can be assumed that on applying an external electric field, the surface density of the charges does not change in the fixed layer (or changes much less than in the diffusion layer).

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Dissertations Defended in the Scientific Council of the Institute of
Physics of the Earth, Institute of Physics of the Atmosphere and
Institute of Applied Geophysics,Ac.Sc. USSR during the First
Semester in 1957.

E.I. Parkhomenko - Piezo-electric Effect of Rocks (P'ezoelek-
tricheskiy effekt gornykh porod) - Candidate dissertation.
Opponents:  Doctor of Physico-Mathematical Sciences V.F.
Bonchkovskiy, Candidate of Physico-Mathematical Sciences I.S.
Zholudev, Candidate of Technical Sciences B.A. Bazhenov.
July 21, 1957.
For many centuries, the descriptions of earthquakes mentioned
the light effects, but the physical nature of the latter
was not known. With the development of investigations
in electricity and improved instrumentation, the electrical
character of these phenomena was established.  Only individual
statements of hypothetic character exist on the sources of
the changes of the electrical field of the Earth.  In view of
the importance of this problem of a possible relation between
the electro-magnetic and the seismic fields, the author studied
the electrical effects in rocks subjected to mechanical forces.
By means of a dynamic method, a piezo-electric effect was
observed in rocks (granite, gneiss, quartzites, etc.) containing
quartz grains which are orientated in a specific way.  In the
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absence of orientation of the quartz grains, no piezo-electric effect was observed. Under laboratory conditions, the existence of the  E  effect discovered by A.G. Ivanov, was confirmed and also its relation  to   the presence of a liquid phase in rocks.  On the basis of investigation of ideal piezo-electric textures of quartz in accordance with the theory of A.V. Shubnikov, it was found that from a single modification of quartz, it is possible to form piezo-electric textures of the first kind, type $\infty$ and $\infty$:2  and of two shapes of quartz, it is possible to form a texture of the type $\infty$.m . The possibility was elucidated of ordinating quartz-containing rocks to piezo-electric textures of the type $\infty$.m  and also to the symmetry class 3:2. A technique was developed of the qualitative measurement of the piezo-electric moduli of rocks in the case of longitudinal and transverse effects, by the static method applying an electrometer.  It is shown that in rock specimens of volumes of the order of 10 $cm^3$, the piezo-

Card20/21 electric effect can be observed owing to the non-compensated

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Physics of the Earth, Institute of Physics of the Atmosphere and
Institute of Applied Geophysics, Ac.Sc. USSR during the First
Semester of 1957.

effect of the individual quartz grains.  On the basis of
experimental data, the coefficient of orientation of the quartz
grains was calculated with some degree of approximation in
various rocks by means of the formula of Zheludev.  Model tests
on granite blocks enabled establishment (in addition to an
elastic wave) of two types of electro-magnetic oscillations.
Oscillations of one type precede the arrival of the elastic
wave and coincide with the incident of emission,  oscillations
of the other type  are  recorded at about the same time as
the elastic wave.  The oscillations of the first type are
caused by the piezo effect of the granite block near the
emmitter of the ultra-sound, whilst oscillations of the second
type are caused by the piezo-electric effect of the same granite
near to the receiver.  The results of these experiments can be
applied in studying the physics of earthquakes and also for
developing new methods of electric prospecting.

AVAILABLE:  Library of Congress.
Card 21/21

3(7),24(4)
AUTHOR:     Pyaskovskaya-Fesenkova, Ye. V.                SOV/20-123-2-16/50

TITLE:      On Some Optical Properties of the Atmosphere of the Lybian
            Desert (O nekotorykh opticheskikh svoystvakh atmosfery
            liviyskoy pustyni)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 2, pp 269-271
            (USSR)

ABSTRACT:   The authoress and her collaborators carried out investigations
            in Egypt (October-November 1957) in connection with the prog-
            ram of the International Geophysical Year. The expedition work-
            ed in the Libyan desert south of Assuan ( $\varphi = 23^\circ 59'$,
            $\chi = 32^\circ 52'$) in a distance of 1 km from the river Nile and
            about 200 km west of the Red Sea. The following was found: The
            optical properties of the atmosphere are very constant in the
            forenoon and afternoon hours. Nevertheless, this constancy was
            disturbed for several hours at about noon, after which the
            atmosphere became more transparent than in the forenoon, a
            phenomenon that is only very rarely observed in the USSR. The
            aureole of the sun was weaker in the afternoon than in the
            forenoon. The atmosphere at the place where observations were
            carried out was very homogeneous in optical respect on cloud-

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On Some Optical Properies of the Atmosphere of the        SOV/20-123-2-16/50
Lybian Desert

less days. A schematical drawing shows 2 scattering indicat-
rices which were determined on October 25  on the basis of
observations of the brightness of the sky along the entire
almucantar of the sun with a zenith distance of $z = 74°$. These
two indicatrices hardly differ at all from each other. There
was no fine atmospheric dust, there was little moisture, and
it was probably for this reason that a green shine became
noticeable nearly every evening before sunset. The increase of
transparency in the afternoon influenced the polarization
properties of the atmosphere. The degree of polarization of the
sky by day is always less high in the afternoon than in the
forenoon. The authoress determined the direction and the
amount of polarization by means of a visual photometer des-
cribed in one of her earlier papers (Ref 2). The degree of
polarization attains very high values; it is higher in the
afternoon than in the forenoon, and immediately after sunset
it rose to 80 %. A diagram shows the course of the degree of
polarization in the almucantar of the sun at an angular dis-
tance of $\Delta = 90°$ to the sun, as a function of the atmospheric

Card 2/3        mass m in the direction towards the sun. This curve describes

On Some Optical Properties of the Atmosphere of the     SOV/20-123-2-16/50
Lybian Desert

the observations made on November 16  from z = $87°2'$ in the
morning to $87°34'$ in the evening. When the light is scattered
in the first order, the direction of the oscillation plane
must be vertical to the plane of vision. In the forenoon of
November 16, the transparency coefficient amounted to p = 0.85,
and the difference between the measured and the theoretical
plane of oscillation remained constant ($\sim 2°$). In the after-
noon (p = 0.89) these two planes were in agreement. There are
4 figures and 4 references, 3 of which are Soviet.

PRESENTED:    July 12, 1958, by V. G. Fesenkov, Academician

SUBMITTED:    July 12, 1958

Card 3/3

3(7)

AUTHOR:       Pyaskovskaya-Fesenkova, Ye. V.               SOV/20-123-6-14/50

TITLE:        On the Scattering and Polarization of Light in the Atmosphere
              Under the Conditions of the Lybian Desert (O rasseyanii i
              polyarizatsii sveta v atmosfere v usloviyakh liviyskoy pustyni)

PERIODICAL:   Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 1006-1009
              (USSR)

ABSTRACT:     The authoress investigated the luminosity and the polarization
              of the daylight sky in October-November 1957 in the Lybian
              Desert 20 km south of Assouan ($\varphi = 23^{\circ}59'$ , $\lambda = 32^{\circ}52'$ ,
              $h \sim 200m$) by means of a visual photometer provided with a yellow
              Schott (Shot) filter and with a polaroid. The degree and the
              angle of polarization were determined according to the method
              of V. G. Fesenkov, according to which the luminosity of the
              investigated point of the sky is measured through a polaroid at
              3 positions $B_1$, $B_2$, $B_3$ at various angular distances $\alpha$ from the
              sun in the solar almucantarat. (These points on the sky and the
              sun have the same distance from the zenith). The angular
              distances between the positions $B_1$, $B_2$, and $B_3$ amount to $60^{\circ}$ .

Card 1/3       Moreover, the authoress measured the luminosity of a plane

On the Scattering and Polarization of Light          SOV/20-123-6-14/50
in the Atmosphere Under the Conditions of the Lybian Desert

perpendicular to the sunbeam. From these data, the degree of
polarization, the orientation of the plane of the light
vibrations, the total luminosity B, and the scattering
indicatrix could be determined. Moreover, the scattering
indicatrix could be divided into 2 components. One of them is
the indicatrix of the scattering in natural beams, the other one,
in polarized beams. Moreover, the total scattering indicatrix
was subdivided into 2 other components: one of them corresponds
to  molecular scattering, the other to aerosol scattering.
Finally, the authoress tried to separate out the degree of
polarization caused by aerosols and to subdivide the aerosol
indicatrix into 2 indicatrices which correspond to natural and
to polarized beams. A diagram shows the distribution of the
polarization degree P along the almucantarat of the sun. The
maximum polarization degree was at $\sim \mathscr{N} = 90^\circ$ and was equal to
74%. The second diagram gives the orientation of the plane of
the light vibrations with respect to the corresponding vertical
as a function of the angular distance $\mathscr{N}$ from the sun. The third
diagram shows the total indicatrix in polar coordinates.
A formula is then given for the intensity of the polarized light.

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On the Scattering and Polarization of Light          SOV/20-123-6-14/50
in the Atmosphere Under the Conditions of the Lybian Desert

> In first approximation, there is no atmospheric depolarization
> and the total polarization consists of 2 components which are
> caused by molecules and aerosols, respectively. There are
> 4 figures and 3 Soviet references.

PRESENTED:     August 11, 1958, by V. G. Fesenkov, Academician

SUBMITTED:     August 8, 1958

Card 3/3

23933
S/035/61/000/006/015/044
ACO1/A101

3.1510

AU: ...          Pyaskovskaya-Fesenkova, Ye.V.

TITLE:          Some data on sky polarization in southern Egypt

PERIODICAL:     Referativnyy zhurnal. Astronomiya i Geodeziya, no. 6, 1961, 26-27,
                abstract 6A231 ("Izv. Astrofiz. in-ta AN KazSSR", 1959, v. 8, 82-
                97, Engl. summary)

TEXT:           The author describes the results of observations on atmospheric op-
tics in southern Egypt, conducted by an expedition of the Academy of Sciences,
USSR, in the fall 1957. A visual photometer of daily sky (for measuring the brigt-
ness and polarization of the sky) and a photoelectric photometer (for observations
of circumsolar aureole and control of stability of the atmosphere optical proper-
ties) were used. It was found out that in the region investigated a good stabili-
ty was observed before and after noon, which was disturbed only about noon (fol-
lowed by aureole decrease). In the USSR usually the aureole grows after noon.
Almost every evening a green ray was observed. Polarization degree after noon in-
creased. The V.G. Fesenkov method (Astron. zh., 1935, v. 12, no. 4), which con-
sists in measuring the brightness of a given sky point at three polaroid positions,

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Some data on sky polarization in southern Egypt

was employed for determining degree and angle of polarization. These measurements were performed in almucantar of the Sun and in zenith. The observed polarization angle $\beta_{obs}$ (between the vertical and the plane of light oscillations) was compared with that calculated theoretically ($\beta_{th}$) for first-order scattering. At high transparency the difference between them amounted to 1-2°. In four cases out of 5, polarization maximum in almucantar of the Sun was at scattering angle $\gamma$=60°; i.e., the plane of light oscillations in the real atmosphere coincides with the similar plane at first-order scattering (if transparency is sufficiently high) in proximity of this angle. The author presents components of the summary scattering indicatrix in natural light $\mu'$ and in polarized light $\mu''$, determined from observations in almucantar of the Sun. Component $\mu'$ varies from day to day more than $\mu''$. An attempt is made to single out polarization dependent on aerosol component from the observed (summary) polarization.

G. Livshits

[Abstracter's note: Complete translation]

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23932 S/035/61/000/006/014/044
A001/A101

3,1510

AUT: :        Pyaskovskaya-Fesenkova, Ye.V.

TITLE:        Certain relations in the phenomenon of sky polarization

PERIODICAL:   Referativnyy zhurnal. Astronomiya i Geodeziya, no. 6, 1961, 26, abstract 6A230 ("Izv. Astrofiz. in-ta AN KazSSR", 1960, v. 10, 64-70, Engl. summary)

TEXT:         The author describes the results of observations of brightness and polarization of the clear sky along the almucantar of the Sun at its different heights in the region of the Mountainous Observatory of the Astrophysical Institue, AS KazSSR. The photometer was described by the author earlier (RZhAstr, 1960, no. 5, 4036). Polarization was determined by the V.G. Fesenkov method (measuring sky brightness at three positions of the polaroid (see RZhAstr, 1959, no. 5, 3556). Observations, which were conducted on sky points over mountains and lowlands, have shown that polarization degree was almost the same at equal angular distances to the Sun. Polarization degree P at different scattering angles turned out often to be proportional to "Rayleigh" polarization degree: $P = kP_R$. This relation holds sometimes also at poor transparency. On the other hand, deviations from the Ray-

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Certain relations ...

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S/035/61/000/006/014/044
A001/A101

leigh law may often happen to be very significant. Observations permitted the singling out of summary indicatrix $\mu(\vartheta)$, indicatrix in natural rays $\mu'(\vartheta)$ and in polarized rays $\mu''(\vartheta)$ ($\vartheta$ is scattering angle). A comparison of observational data in different places clarified the problem of relation between $\mu'$ and $\mu''$ at different atmospheric transparency p. It has been found out that $\mu''(90°)$ and $\mu'$ (90°) vary linearly with p and, consequently, the change of a scattered flux in natural light is greater than in a polarized one. This is connected with a lesser light polarization on aerosols (in comparison with molecular polarization).

G. Livshits

[Abstracter's note: Complete translation]

Card 2/2

68983
S/020/60/131/02/022/071
B013/B011

3.9000

AUTHOR:      Pyaskovskaya-Fesenkova, Ye.V.

TITLE:       Some Data on the Polarization of Light by the Atmosphere

PERIODICAL:  Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 2, pp 297-299 (USSR)

ABSTRACT:    The author reports on observations made concerning the brightness
and polarization of the clear sky along the almucantar of the sun
on the mountain observatory of the Astrofizicheskiy institut
AN KazSSR (Institute of Astrophysics of the AS of the Kazakhskaya
SSR) in the surroundings of Alma Ata (h=1450 m) in August, 1956,
in the Aksengerskiy sovkhoz in the surroundings of Alma Ata
(h=500 m) in June - July, 1957, and in the Lybian Desert (Egypt)
(h=200 m) in October - November, 1957. Observations were made by
means of a visual photometer with a yellow Schott filter. Polariza-
tion was determined according to V.G. Fesenkov's procedure. The
brightness of the celestial point under investigation was measured
by a polaroid with three different positions. Polarization degree
and direction of the polarization plane can be determined in a
similar way. The degree of polarization was determined by the formula

$$P(\psi) = \frac{2\sqrt{B_1(B_1-B_2)+B_2(B_2-B_3)+B_3(B_3-B_1)}}{B_1 + B_2 + B_3}$$ , where $B_1, B_2, B_3$ denote the

brightness of the celestial point observed with the three above-

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Some Data on the Polarization of Light by the
Atmosphere

mentioned positions. On certain days, the influence exerted by
aerosols in a real atmosphere manifests itself only by a certain
decrease of the polarization degree

$$P_R(\vartheta) = \frac{\sin^2 \vartheta}{1 + \cos^2 \vartheta},$$

namely, in the same ratio for all scattering angles $\vartheta$. Hence, $P(\vartheta)$ =
= $kP_R(\vartheta)$ holds for these days, with k denoting the maximum polariza-
tion degree in the almucantar of the sun (for $\vartheta$ = 90°). Such a
proportionality does not depend on the atmospheric transparency. The
last-mentioned equation is satisfied well with bad transparency, and
poorly in the case of good transparency. Examples are offered. On
the basis of observations of the sky brightness along the almucantar
of the sun with the three above-mentioned positions of the polaroid
it was possible to determine the scattered light flux $\mu(\vartheta)$ for
different scattering angles $\vartheta$ and to subdivide it into two parts,
namely, into natural rays $\mu'(\vartheta)$ and into polarized rays $\mu''(\vartheta)$.
The ratio between these two scattered fluxes changes with a change
in the atmospheric visibility. $\mu'(90°)$ rises more quickly with
increasing atmospheric dullness than $\mu''(90°)$. Aerosols perhaps
polarize the light to a lesser degree than molecules. For this reason,
Card 2/3    the scattered flux in the case of an increased quantity of aerosols

Some Data on the Polarization of Light by the
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8/020/60/131/02/022/071
B013/B011

ie likely to grow more slowly in polarized rays than in natural
rays. $\mu'(\nu^{\lambda})$ and $\mu''(\nu^{\lambda})$ are likely to depend linearly on the
atmospheric transparency. There are 4 figures, 1 table, and 3
references, 2 of which are Soviet.

PRESENTED:    December 3, 1959, by V.G. Fesenkov, Academician

SUBMITTED:    December 2, 1959

Card 3/3

84686

S/020/60/134/004/010/023
B019/B067

3.1800 (1041, 1062, 1168)

AUTHOR:     Pyaskovskaya-Fesenkova, Ye. V.

TITLE:      Determination of the Transmission Coefficient of the
            Atmosphere From the Polarization of the Sky Light

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 4,
            pp. 812 - 815

TEXT: From 1956 to 1957 the author studied the sky brightness by means
of a polaroid and a photometer on a mountain observatory (1450 m above
sea level) in the Aksengerskiy sovkhoz (Aksengir (?) sovkhoz) near
Alma-Ata and also in the Liviyskaya pustina Yegipetskogo rayon. They also
measured solar radiation and the brightness of the solar corona. These
measurements were made at the mountain observatory by N. I. Ovchinnikova,
in the Aksengerskiy sovnarkhoz by P. N. Boyko, and in the Liviyskaya
pustina by V. M. Kazachevskiy and P. N. Boyko. The observations were made
by means of photometers with yellow Schott glass filter. The effective
wavelength in the system glass - yellow screen was calculated from formula

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Determination of the Transmission Coefficient  S/020/60/134/004/010/023
of the Atmosphere From the Polarization of     B019/B067
the Sky Light

$$\lambda_o = \frac{\int_0^\infty E_\lambda p'_\lambda \varepsilon_\lambda \lambda \, d\lambda}{\int_0^\infty E_\lambda p'_\lambda \varepsilon_\lambda \, d\lambda} \qquad (1)$$

$E_\lambda$ denotes the energy distribution in the spectrum of the light source,
$p'_\lambda$ the transparency of the filter, $\varepsilon_\lambda$ the spectral sensitivity of the
glass. Absolutely black bodies with temperatures of T = 20,000°K, 4,000°K
and the sun (t = 6,000°K) were studied. Results: $\lambda_o$ = 560 m$\mu$ at 20,000°K,
$\lambda_o$ = 565 m$\mu$ at 6,000°K, and $\lambda_o$ = 568 m$\mu$ at 4,000°K. For a light source
of $E_\lambda$ = const, $\lambda_o$ was found to be 567. The effective wavelength in the
system selenium photocell - yellow screen was calculated from formula

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84,686

Determination of the Transmission Coefficient    S/020/60/134/004/010/023
of the Atmosphere From the Polarization of the    B019/B067
Sky Light

$$\lambda_0 = \frac{\int_0^\infty E_\lambda \, p_\lambda' \varepsilon_\lambda p_\lambda^m \lambda \, d\lambda}{\int_0^\infty E_\lambda \, p_\lambda' \varepsilon_\lambda p_\lambda^m \, d\lambda} \qquad (2) \quad.$$

Here, $E_\lambda$ is the energy distribution in the solar spectrum at the
atmosphere boundary, $\varepsilon_\lambda$ the spectral sensitivity of the photocell, $p_\lambda$ the
spectral transmission coefficient, and m the atmospheric mass in the
direction of the sun. For m = 1, $\lambda_0$ was found to be 577, and for m = 5.6,
$\lambda_0$ was found to be 582. The degree of polarization was calculated from
formula $P = 2\sqrt{B_1(B_1-B_2) + B_2(B_2-B_3) + B_3(B_3-B_1)}/(B_1+B_2+B_3)$   (3). $B_i$ are
the three brightnesses of the sky measured by V. G. Fesenkov's method by
means of the polaroid. The transparency coefficients were measured by
three different methods: 1) from solar radiation according to Buger;
2) from measurements of the sky brightness at an angular distance of 60°
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Determination of the Transmission Coefficient    S/020/60/134/004/010/023
of the Atmosphere From the Polarization of the    B019/B067
Sky Light

from the sun, and by a method suggested by the author with the aid of
formula $p = 0.973 - 9.80B(60^o)/E_m m$   (4); 3) from measurements of the solar
corona at the moment of its maximum brightness, by the aid of formula:
$\log p = -M/m_{max}$   (5). In Fig. 1 $P = f(p)$ is graphically represented
according to measurements at the three localities mentioned initially with
scattering angles of $40^o$, $60^o$, and $90^o$. The author points to the nonlinear
character of this dependence which is not locally dependent within the
measurement error. Furthermore, $P = f(\tau)$ is graphically represented (Fig.2)
where $\tau$ denotes the optical path of the atmosphere. The relation
$\ln \tau = 0.035 - 1.344P$ (6) is given for this case. For $\tau = 0.05$ the author
calculated a polarization at $90^o$ of 100%, at $60^o$ of 60%, and at $40^o$ of
26% with a transparency coefficient of 0.95. By taking account of an
effective wavelength in the system glass - screen of 564 m$\mu$ the author
obtains a 83% polarization at a scattering angle of $90^o$ at sea level, and
an 87% polarization at the mountain observatory. There are 2 figures and
1 Soviet reference.
PRESENTED:     May 3, 1960, by V. G. Fesenkov, Academician
SUBMITTED:     April 27, 1960
Card 4/4

PYASKOVSKAYA-FESENKOVA, E.V.   (Alma-ata)

"Some results of investigation about atmospheris scattering and
polarization of the day skylight."

Report submitted in connection with the Symposium on Radiation.
Vienna, Austria    14-19 Aug 1961.

3,5150

S/169/62/000/003/047/098
D228/D301

AUTHOR:       Pyaskovskaya-Fesenkova, Ye. V.

TITLE:        Daytime sky polarization (Theses)

PERIODICAL:   Referativnyy zhurnal, Geofizika, no. 3, 1962, 26, ab-
              stract 3B212 (V sb. Aktinometriya i atmosfern. optika,
              L., Gidormeteoizdat, 1961, 103-104)

TEXT:  The results of sky brightness observations, carried out in
the Libyan desert, in southern Egypt, and at a mountain observato-
ry near Alma-Ata, are analysed. V. G. Fesenkov's method was used
in determining the degree of sky-dispersed light polarization and
the orientation of the plane of the electrical vector's variations.
An attempt was made to distinguish from the summary radiation, ob-
served along the sun's almacantar, the radiation that depends on
the presence of aerosols in the atmosphere. The maximum of the aero-
sol component of the polarization can be observed at an angular
distance of 110 - 120° from the sun and amounts to 40%. /_Abstrac-
ter's note: Complete translation._/
Card 1/1

*3,5150*

S/169/62/000/003/061/098
D228/D301

AUTHOR:       Pyaskovskaya-Fesenkova, Ye. V.

TITLE:        Methods of determining the coefficient of atmospheric
              transparency from the sky brightness (Theses)

PERIODICAL:   Referativnyy zhurnal, Geofizika, no. 3, 1962, 28, ab-
              stract 3B232 (V sb. Aktinometriya i atmosfern. optika,
              L., Gidrometeoizdat, 1961, 144)

TEXT:  Three methods of determining the coefficient of transparen-
cy are suggested: 1) From the moment of onset of the brightness
maximum of the circumsolar halo, since in this case there is a very
simple relationship; 2) from the indicatrix of dispersion when true
absorption is absent; and 3) from empirical formulas, derived on
the basis of much observational material. /¯Abstracter's note: Com-
plete translation._7

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S/035/61/000/012/008/043
A001/A101

AUTHORS:       Pyaskovskaya-Fesenkova, Ye.V., Boyko, P.N., Belyak, G.M., Boyko, V.

TITLE:         Some data on attenuation and dispersion of light at various altitudes above sea level

PERIODICAL:    Referativnyy zhurnal. Astronomiya i Geodeziya, no. 12, 1961, 33, abstract 12A285 ("Izv. Astrofiz. in-ta AN KazSSR", 1961, v. 11, 78 – 88, Engl. summary)

TEXT:          Brightness of daily sky on the Sun's almucantar was measured simultaneously at two points $\theta = 57$ and $60°$ at the Mountain – Observatory of the Astrophysical Institute, AS KazSSR, and on the Kumbel' mountain. A visual photometer and a photoelectrical photometer with selenium photoelement were used. Transparency coefficients (P), optical thicknesses of atmosphere ($\tau$) and scattering indicatrices $\mu(\theta)$ were determined from the measurement data. It is noted that transparency coefficients over the lowland and mountains differ only slightly. Linke's turbidity factor increases in afternoon hours in comparison with morning

Card 1/2

Some data on attenuation ...

S/035/61/000/012/008/043
A001/A101

hours, and this increase is more noticeable at the Observatory than on the Kumbel' mountain. Absolute scattering indicatrices on the Kumbel' mountain on 29 August prior and after noon increased by 30 - 85%.

V. Golikov

[Abstracter's note: Complete translation]

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S/913/62/003/000/002/033
D405/D301

AUTHOR:     Pyaskovskaya-Fesenkova, Ye. V.

TITLE:      Development of atmospheric optics in Kazakhstan

SOURCE:     Akademiya nauk Kazakhskoy SSR. Astrofizicheskiy
            institut. Trudy. v. 3, 1962. Rasseyaniye i poly-
            arizatsiya sveta v zemnoy atmosfere; materialy
            Soveshchaniya po rasseyaniyu i polyarizatsii
            sveta v atmosfere. 14 - 25

TEXT:          The study of atmospheric optics in Kazakhstan
was initiated in September 1941, when eight expeditions from
various parts of the USSR arrived there to study the total solar
eclipse. Soon afterwards it was decided by the Council of Ministers
of the USSR ( at the initiative of V.G. Fesenkov ) to create the
Institute of Astronomy and Physics at the Kazakh Branch of the
Academy of Sciences USSR. The early days of the Institute coincided
with the difficult stage of the Second World War, so that great
obstacles were encountered in instrument construction. Many instruments

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Development of atmospheric optics ... D405/D301

were constructed by the scientists themselves, in particular V.G.
Fesenkov; among these were an instrument for laboratory deter-
mination of the scattering function in turbid media and an instru-
ment for the determination of the absolute albedo of reflecting
surfaces. In 1950 the Institute of Astronomy and Physics was divided
into two: the Astrophysical Institute and the Physicotechnical
Institute; in addition an independent Section for Astrobotany was
created. The Astrophysical Institute moved to the Kamensk Plateau.
Various expeditions were organized, mainly inside Kazakhstan; among
them: to the Kumbel' Mountain (3200 m) and the Great Alma-Ata Lake,
the Sary-Ishik-Otrau desert (near the Balkhash Sea), etc. Other
expeditions led to the Sikhote-Alin'sk Mountain Range in the Far East,
and to the Black-Sea (Gudaut). During the International Geophysical
Year 1957, an expedition was sent to Egypt where it worked in the
desert South of the town of Assuan. The research of the Atmospheric-
Optics Section was mainly concerned with the scattering capacity
of the atmosphere, the extinction of light by the atmosphere, solar
halos, the energy distribution in the spectrum of the diurnal sky, etc.
In recent years, the polarization of light of the diurnal sky was

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Development of atmospheric optics .

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D405/D301

investigated, as well as the scattering of light in the bottom layer of the atmosphere. For this purpose three new instruments were constructed: a spectro-electropolarimeter with automatic recording of spectra, a diurnal-sky electropolarimeter using a photomultiplier, and a two-channel polarimeter which enables to directly determine the 3 first parameters of Stokes (intensity, difference between intensities at two mutually perpendicular directions, and the angle of the polarization plane. The polarization in the lower atmosphere was studied by a specially-designed photoelectric photometer. Here are some of the results of nearly 20 years of research in atmospheric optics: The solar halo attains its highest brightness when the direct solar radiation, is attenuated by a factor e (the base of natural logarithms) in the direction of the line of sight. The sky brightness with respect to the solar illumination does not depend, at an angular distance of 57° from the Sun, on the form of the scattering function. The nature of the latter is the same irrespective of climatic- and meteorologic conditions. Among the theoretical studies are V.G. Fesenkov's theory of vertical visibility, etc., and the new method

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Development of atmospheric optics .. S/913/62/003/000/002/033
D405/D301

of determination of light scattering of higher order, proposed by the author. The main work of the Astrobotanical Section dealt with the hypothese on plant life on Mars. In conclusion, the author notes the great advantages which Kazakhstan offers (in particular through its atmospheric stability) for research in atmospheric optics. There are 8 figures.

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S/913/62/003/000/003/033
D405/D301

AUTHOR:      Pyaskovskaya-Fesenkova, Ye. V.

TITLE:       Some data on sky brightness

SOURCE:      Akademiya nauk Kazakhskoy SSR. Astrofizicheskiy
             institut. Trudy. v. 3, 1962. Rasseyaniye i poly-
             arizatsiya sveta v zemnoy atmosfere; materialy
             Soveshchaniya po rasseyaniyu i polyarizatsii
             sveta v atmosfere. 26 - 30

TEXT:        The variations are ascertained of the directional
scattering coefficient $\mu$ pertaining to points of the sky which do
not belong to the solar almacantar parallel of altitude. For this
purpose the author observed the brightness of sky points which do
not change their zenith distance with time, while their azimuth
changes; (the angular distance from the Sun $\vartheta$ was the same for
all the points). The observations were conducted at the mountain
observatory of the Astrophysical Institute of the AS KazakhSSR
near Alma-Ata. In this region the atmosphere is quite frequently

Card 1/2

Some data on sky brightness

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D405/D301

homogeneous in the horizontal direction. The directional scattering coefficients were determined by a well known formula of sky brightness in which multiple scattering is neglected. From figures plotting the coefficient $\mu$ as a function of atmospheric mass, the following conclusions were obtained: At constant angular distance from the Sun the directional scattering coefficient $\mu$ decreases when the Sun approaches the horizon (the zenith distance of the point under consideration remaining fixed); it remains constant for the solar almacantar; it decreases, when the Sun approaches the horizon, for points which are on an almacantar that is higher than the solar almacantar and which move together with the latter so that $z-\zeta=$const (z denoting the zenith distance of the Sun, and $\zeta$ the zenith distance of the point under consideration); it increases, when the Sun approaches the horizon, for points which are on an almacantar lower than the solar and move together with latter as above. These results are discussed in relation to such factors as the decreasing atmospheric density with altitude, multiple scattering, ground reflection, etc. It is noted that the observations of light polarization confirm the above results. There are 3 figures.

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S/913/62/003/000/013/033
D405/D301

AUTHOR:          Pyaskovskaya-Feeenkova, Ye. V.

TITLE:           On the effective sky-brightness layer

SOURCE:          Akademiya nauk Kazakhskoy SSR. Astrofizicheskiy
                 institut. Trudy. v. 3. 1962. Rasseyaniye i
                 polyarizatsiya sveta v zemnoy atmosfere;
                 materialy Soveshchaniya po rasseyaniyu i poly-
                 arizatsii eveta v atmosfere. 83 - 88

TEXT:            The height $h_0$ of the effective-brightness layer
ie defined by a formula involving integrals of the brightness $B_h$,
Thereby it is assumed that the atmosphere consiets of thin plane-
parallel homogeneoue layers, that the density and optical thickness
of the atmosphere decrease exponentially, and that multiple scatter-
ing and light reflection from the ground are abeent. After evaluat-
ing the integrale, the author illustrates the method of calculation
by a numerical example. On the basis of this example the following
conclusions are obtained:  1) For celestial pointe of fixed zenith

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On the effective sky-brightness ... D405/D301

distance and angular distance from the Sun, the height $h_0$ increases when the Sun approaches the horizon. Hence in this case the lower atmospheric layers become less and less effective. 2) For a fixed position of the Sun, $h_0$ decreases for celestial points from zenith to horizon. 3) For the points of the solar almacantar, $h_0$ remains fixed when the zenith distance of the Sun varies, being equal to the height of the homogeneous atmosphere. 4) For any celestial point, $h_0$ attains its maximum value when the zenith distance of the Sun is $90^0$. The maximum possible value of $h_0$ for a given optical thickness $\tau$ occurs at the zenith, when the Sun is at the horizon; for $\tau = 0.2$ this maximum value is 20 km. 5) The value of $h_0$ is larger than the height of the atmosphere H for the points above the solar almacantar, and smaller than H for the points below it. There are 2 figures.

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S/913/62/003/000/021/033
D405/D301

AUTHOR:          Pyaskovskaya-Fesenkova, Ye. V.

TITLE:           Atmospheric polarization with allowance for
                 multiple scattering

SOURCE:          Akademiya nauk Kazakhskoy SSR. Astrofiziches-
                 kiy institut. Trudy. v. 3. 1962. Rasseyaniye
                 i polarizatsiya sveta v zemnoy atmosfere;
                 materialy Soveshchaniya po rasseyaniyu i
                 polyarizatsii sveta v atmosfere. 133-142

TEXT:            The author determined the atmospheric of light
from sky-brightness observations. The method and formulas of V.G.
Fesenkov were used. The method consists in measuring the bright-
ness by a polaroid at three of its positions which are at an angular
distance of 60° from each other. The observations were conducted
at 3 sites: 2 in the neighborhood of Alma-Ata and the third in the
Libian Desert (Southern Egypt). The optical thickness of the atmo-
sphere τ was determined by an empirical method proposed by the author.

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Atmospheric polarization ...        S/913/62/003/000/021/033
                                    D405/D301

Thereby the effects of multiple scattering, of ground reflection,
and those due to the presence of aerosols, are taken into account;
it is assumed that the multiple-scattering intensity is not depen-
dent on azimuth. The method was verified theoretically; it was
shown that, under certain conditions, the method involves an error
of a few percent only. In order to separate the integral and aerosol
scattering functions into polarized and non-polarized light com-
ponents, the author neglected the polarization of the multiply-
scattered light. The reasons for such an assumption are set forth.
From the curves representing the degree of polarization as a func-
tion of the scattering angle it is evident that, for a transparency
coefficient of 0.88, the effect of multiple scattering is negligibly
small; on the other hand, for a transparency coefficient of 0.80
it is no longer possible to neglect the multiple scattering. The aero-
sol degree of polarization, just as the integral one, increases with
atmospheric transparency; for a transparency coefficient of 0.88, the
degree of polarization of light scattered by aerosols was found to be
36%, and for a transparency coefficient of 0.80 it was 29%. There
are 6 figures and 1 table.

Card 2/2

PYASKOVSKAYA-FESENKOVA, Ye.V.

Indicatrices of light scattering at snow cover.  Izv.Astrofiz.
inst.AN Kazakh.SSR 15:117-120 '62.                (MIRA 16:1)
                         (Light—Scattering)

PYASKOVSKAYA-FESENKOVA, Ye.V., doctor fiziko-matematicheskikh nauk

Conference on problems of atmospheric scattering and polari-
zation of light. Vest.AN Kazakh.SSR 18 no.5:81-82 My '62.
(MIRA 17:10)

PYASKOVSKAYA-FESENKOVA, Ye.V.

Some polarizing properties of the daytime sky. Izv. AN Kazakh.
SSR. Ser. fiz.-mat.nauk  no.1 83-92 '63.          (MIRA 17:4)

ACC NR: AR6035286          SOURCE CODE: UR/0269/66/000/009/0027/0027

AUTHOR: Pyaskovskaya-Fesenkova, Ye. V.

TITLE: Atmospheric polarization of light with dry and wet aerosols

SOURCE: Ref. zh. Astronomiya, Abs. 9.51.245

REF SOURCE: Tr. Astrofiz. in-ta. AN KazSSR. v. 7, 1966, 79-84

TOPIC TAGS: atmospheric optics, optics, light polarization, aerosol, light scattering

ABSTRACT: Data are presented on the polarization of light scattered in the day-time at differenct points in the sky in various localities principally along the solar almucantar. The observations showed that at the same atmospheric optical thick-ness, the degree of polarization (P) is approximately 10% less when dry aerosols predominate over moist ones. If multiple scattering is assumed to be nonpolarized and independent of the azimuth, then the computer degree of aerosol component $(P_a)$ polarization is independent of atmospheric transparency. The mean value of $P_a$ in a location with predominantly moist aerosols was found to be greater (50.3%)

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ACC NR: AR6035286

than with predominately dry aerosols (28.5%). In computing $P_a$, molecular anisotropy was not taken into account, which reduces the values obtained by 2—3%. It is assumed that the differences observed in the degree of polarization are explained by the difference in the polarization properties of dry and moist aerosols. [Translation of abstract] [SP]

SUB CODE: 03/

Card 2/2

LIVSHITS, G.Sh.; FESENKOV, V.G., akademik, red.; IDLIS, G.M., doktor
fiz.-matem.nauk, zamestitel' red.; PYASKOVSKAYA-FESENKOVA, Ye.V.,
doktor fiz.-matem.nauk, red.; ROZHKOVSKIY, D.A., doktor fiz.-matem,
nauk, red. toma; RUDINA, M.P., kand.fiz.-matem.nauk, red.;
ROZHKOVSKIY, D.A., doktor fiz.-matem.nauk, red.

[Light scattering in the atmosphere. Pt.1.] Rasseianie sveta v
atmosfere. Alma-Ata, Nauka. Pt.1. 1965. 176p (Akademiia nauk
Kazakhskoi SSR. Astrofizicheskii institut. Trudy, vol.6)
(MIRA 18:5)

Name: PYASKOVSKIY, Anatoliy Vladimirovich

Dissertation: The Revolution in Turkestan in the years 1905-1907

Degree: Doc Historical Sci

Affiliation: /not indicated/

Defense Date, Place: 27 Feb 56, Council of Inst of History, Acad Sci USSR

Certification Date: 15 Sep 56

Source: BMVO 6/57

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PYASKOVSKIY, B. [P"iaskovs'kyi, B.]

Problem of the antiworld.  Nauka i zhyttia 10 no. 12:53 D '60.
(MIRA 14:4)

(Matter)

PYASKOVSKIY, B. [Piaskovs'kyi, B.]

Valuable beginnings. Dop.AN URSR no.4:562-564 '60. (MIRA 13:7)
(Euler, Leonard, 1707-1783)
(Liapunov, Aleksandr Mikhailovich, 1857-1918)

**The problem of desert crusts.** B. V. Pyankovskii. *Pedology* (U. S. S. R.) 26, 98-107(1931).—P. cites the formation of crusts formed on rocks in the Dnieper River. Analyses of several samples are given, showing that many of them contain Mn, which apparently produces the dark color. The various constituents found in the crusts are pptd. from water, in which the Mn and Fe are in the form of bicarbonates, when the rocks are exposed to the air. The discovery of such crusts in any region can, therefore, not be taken as an indication of a desert type of climate.    J. S. Joers

FYASKOVSKIY, B. V.

Moscow

"Loess as a deep soil formation"

Pochvovedeniye, No. 11, 1946.

PYASKOVSKIY, B. V.

USSR (600)

Sponges

Paleogenic sponges in an exceptional state of preservation.  Priroda 41 no  1, 1952

FYASKOVSKIY, B.V.

What Is Loess?  Materialy po inzh. geologii, No 3, 1953, 56-68

The aughor analyzes the ideas of L. S. Berg, who explained the origin of loess from the viewpoint of soil-formation processes and refuted the aeolian theory.  In the formation of loess two stages are distinguished: accumulation of fine earth (the matrix of loess), and its process of loess forming.  The author's opinion is that loess is formed under the humus layer of steppe soils and is a component part of their profile and that loess is a lime melkozem $\underline{/}$ fine earth $\underline{/}$ of dust-like mechanical composition possessing a number of characteristic signs.  (RZhGeol, 1, 1954)

SO: W-31128, 11 Jan 55

USSR/Geology - Desert soils

Card  1/1        :    Pub. 86 - 25/35

Authors          :    Pyaskovskiy, B. V.

Title            :    Did a desert exist in southern Ukrainia during the Pliocene epoch?

Periodical       :    Priroda 44/2, 115 - 116, Feb 1955

Abstract         :    A study is made of the loess soil in the southern part of the
                      Ukraine.  In 1914 the scientist, I. Levinskiy, discovered
                      beneath a thick layer of clay rounded-off brick-red rock covered by a
                      black shiny coating, which could be attributed to "desert burn."
                      This is found at Kherson and near Odessa.  Against the desert
                      theory are the findings of other scientists attributing the
                      formations described to other causes, thus leaving the question
                      in doubt.  Two USSR references (1914 - 1931).  Illustration.

Institution      :    State Scientific Research Institute of Rock Chemical Materials

Submitted        :    .....

A form of contact of loess with parent rock. B. V. Pyaskovskii. *Pochvovedenie* 1956, No. 7, 40-8.—Loess was spotted in the form of tongue-like projections into the parent material of quaternary deposition of alluvial-proluvial formations. The loess, 3 m. deep, is edging off its deposits into the parent material. Several samples of the loess and of its contact with parent material were analyzed mechanically and chemically. Certain similarities in porosity, d., and other phys. properties have been found between the loess and underlying material. The water ext. of these materials and the overlying loess is chemically ($SO_4$ and $Ca$) very close. An outstanding characteristic of the loess is its carbonate accumulation, 17.47 against 4.52% in the parent material. It is thus concluded that the evidence is clear: loessification of parent material is a process assocd. with soil formation under conditions of an arid climate. Actually the loess is a formation under the genetic horizon of the soil in the environment of an arid climate which comprises an inseparable part of its profile. Loess represents a carbonate of a silty mech.

PUTYATA, T.V.; P'YASKOVSKIY, B.V. [P'iaskovs'kyi, B.V.]

Work of a seminar on the history of mathematical sciences.
Dop. AN URSR no.5:678 '63.                          (MIRA 17:9)

PYASKOVSKIY, B.V. [Piaskovs'kyi, B.V.]

Philosophic views of N.G.Chernyshevskii on the role of mathematics in the cognition of nature. Ist.-mat. zbir. 4:42-55 '63.                                                                                      (MIRA 17:3)

SHEYKO, A.N.; P'YASKOVSKIY, B.V. [P'iaskovs'kyi, B.V.]

"Dialectics as logic" by P.V.Kopnin. Reviewed by A.N.Sheiko.
Dop. AN URSR no.2:273-275 '62.                    (MIRA 15:2)
                    (Dialectical materialism)

P'YASKOVSKIY, B.V. [P"iaskovs'kyi, B.V.]

Is it possible to shorten time?  Nauka i zhyttia 11 no. 4:53-54
Ap '61.                                    (MIRA 14:5)
                    (Space and time)

SHTOKALO, I.Z.; PYASKOVSKIY, B.V. [Piaskovs'kyi, B.V.]; RAVIKOVICH, S.D. [Ravikovych, S.D.]

"Lenin and modern physics" by V.Hott.  Reviewed by I.Z.Shtokalo, B.V.Pi skovs'kyi, S.B.Ravikovych.  Dop.AN URSR no.11:1572-1575 '60.
(MIRA 13:11)

(Physics--Philosophy)    (Lenin, Vladimir Il'ich, 1870-1924)
(Hott, V.)

PYASKOVSKIY, B.V. [Piaskovs'kyi, B.V.]

Conference on the history of mathematics continues its work.
Dop.AN URSR  no.1:119-121  '60.                    (MIRA 13:6)
                    (Ukraine--Mathematics)

MELIKOV, N. [Melykov, N.]; PYASKOVSKIY, B.V. [Piaskovs'kyi, B.V.]

Book on space and time in the theory of relativity ("Problems of
space and time in the theory of relativity" by P.S.Dyshlevyi.
Reviewd by N.Melykov, B.V.Piaskovs'kyi). Dop.AN URSR  no.2:
252-256  '60.                                         (MIRA 13:6)
        (Relativity (Physics))   (Space and time)

PYASKOVSKIY, B.V  [P'iaskovs'kyi, B.V.]

Scientists disproved faith in God.  Nauka i zhyttia  10
no.2:46-50  F '60.                                  (MIRA 13:6)
                (Religion and science)

PYASKOVSKIY, D.V.; NESMYANOVICH, A.T.

Observations of the total solar eclipse of February 15, 1961,
by an expedition of the Kiev Branch of the All-Union Astronomic
and Geodetic Society. Biul. VAGO no.33:13-15  '63.
                                        (MIRA 16:4)

1. Kiyevskoye otdeleniya Vsesoyuznogo astronomo-geodezicheskogo
obshchestva.
                (Eclipses, Solar—1961)

PYLAYEV, AIY, D.V.; HAYRAPET, .H.

Observation of total solar eclipse of February 15, 1961.
Astron.tsir. no.220:13-14 Ap '61.                    (MIRA 14:10)
(Eclipses, Solar--1961)

PYASKOVSKIY, R.V.

Method for calculating reduction corrections of the deep-water thermometer readings. Meteor.i.gidrol. no.9:50-51 S '63.

(MIRA 16:10)

1. Severo-Zapadnoye upravleniye gidrometeorologicheskoy sluzhby.

KOROSTELEVA, O.I.; PYASKOVSKIY, S.V.; BYCHKOVA, G.I., red.

[Annotated bibliography of the literature on machine ac-
counting and computing work for 1954-1963] Bibliografi-
cheskii annotirovannyi ukazatel' literatury po mekhani-
zatsii ucheta i vychislitel'nykh rabot (za 1954-1963 gg.)
Moskva, Statistika, 1965. 271 p.            (MIRA 18:6)

1. Russia (1923-  U.S.S.R.) Glavnoye upravleniye vychisli-
tel'nykh rabot.

PYASKOVSKIY, Viktor Nikolayevich; TIMIN, Aleksandr Ivanovich;
   MALKOVA, I., red.; NIKOLAYEVA, T., tekhn.red.

   [Airplanes over the fields]  Samolet nad poliami.  Kaliningrad,
   Kaliningradskoe knizhnoe izd-vo, 1960.  75 p.

                                                    (MIRA 13:12)

       (Aeronautics in agriculture)
      (Spraying and dusting equipment)

PYASKOVSKIY, Ye. (Pol'skaya Narodnaya Respublika)

Technology of iron production in the Polish area during the
Hallstatt epoch (8th-4th centuries B.C.) Vop.ist.est.i tekh.
no.8:137-144 '59.                    (MIRA 13:5)
                (Poland--Hallstatt period)

GALKOVSKAYA, M.G., kand.tekhn.nauk; NAUMOV, A.I.; PYATLIN, A.A.; SVI-
RIDOV, A.A.; SEDOV, F.G.; KHODUNOV, M.Ye., kand.yurid.nauk;
SHANCHUROV, P.N., kand.tekhn.nauk; SOYUZOV, A.A., prof., doktor
tekhn.nauk, red.; GOLOVNIKOV, V.I., kand.tekhn.nauk, red.;
ZOTOVA, V.V., kand.tekhn.nauk, red.; SEMENOV, Yu.K., red.;
ALEKSEYEV, V.I., red.izd-va; YERMAKOVA, T.T., tekhn.red.

[River navigator's manual] Spravochnik shturmana rechnogo flota.
Pod obshchei red. A.A.Soiuzova. Moskva, Izd-vo "Rechnoi transport,"
1960.  631 p.                                    (MIRA 13:7)
           (Inland navigation)

PYASKOVSKIY, Boleslav Vital'yevich [Piaskovs'kyi, B.V.]; GOTT, V.S.[Hott, V.S.], kand.fiziko-matem.nauk, glavnyy red.

[Struggle of materialism against idealism in present-day mathematics] Borot'ba materializmu z idealizmom v suchasnii matematytsi. Kyiv, 1960.  p. 39. (Tovarystvo dlia poshyrennia politychnykh i naukovykh znan' Ukrains'koi RSR.  Ser.5, no.1).
(MIRA 13:6)

(Mathematics--Philosophy)

PYASKOVSKIY, B.V.

Tow views on loess. Pochvovedenie no.5:110-111 My '57.  (MLBA 10:9)
(Loess)

Photography in astronomical practice.   D. Pyaskovskii. Astron. J. Soviet Union 13, No. 4, 330-34(1936).—The influence of temp. and moisture on the sensitivity, the Herschel effect, diffuse radiation, the properties of developers, change of sensitivity, fixing and fixing baths, and special infrared-sensitive plates are discussed.

F. H. Rathmann

PYASKOVS'KIY, D.V., professor.

Brief outline of the history of astronomy at Kiev University.
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(Kiev--Astronomy)